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Title: "Ergonomically Configured Shoulder Straps System"

Specification for a Letters Patent

10 BACKGROUND OF THE INVENTION

Field

The field of the inventions described herefollowing may be best characterized generally as dual strap systems for loads to be carried at ones side and more specifically as dual shoulder straps arranged to cooperate with the human body for aiding in carrying loads at ones side or hip.

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Prior Art

Teachings for systems including double straps arranged to support bags carried by a human user are plenty. Each of these teachings, having appreciable merit, may be said to be directed at a particular problem relating to carrying a load, usually via a bag or sack. While many important issues have been addressed, the teachings of the art fail to reach precisely certain problems which are readily observed in common uses of tote type bags today. One only need recall a hurried passenger at an airport who attempts to carry a heavy bag having a shoulder strap, for example a garment bag, to recall images of that person suffering from an uncooperative load and carrying system. Complex human body shapes and human body motions tend to disturb the intended operation of carrying systems contrary to the good intentions of designers of such systems. For a more complete understanding, consider the following examples.

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The common backpack is immediately recalled as a useful pack comprised of two shoulder straps. Shoulder straps of a backpack or rucksack tend to be symmetrical. Thus, the straps equally transfer the weight of the pack to wearer's shoulders so long as the pack is worn centered at ones back. Sometimes a backpack is worn with a single

strap over a single shoulder. When the pack is light this arrangement is particularly useful as the burden of weight is not great and is easily accommodated by a single shoulder.

5 Skiers the world over will be first to appreciate that a pair of snow skis, when carried rather than ridden, are heavy and quite bulky. Snow skis are difficult to manage as a carried load in view of limitations of the human body. Inventor Fred Arias of Huntington Beach, California teaches a systems to relieve one of the problem of transporting this cumbersome load on ones self. In U.S. Patent 5,575,412, a specialized shoulder strap is arranged and configured to support a set of snow skis and perhaps ski
10 poles as well. The arrangement is particularly interesting as it is well designed with the shape of the human body in mind. Drawing figures 1 - 3, are clearly presented as illustration of the cooperation between a plurality of straps and the human torso. When used as directed, the skis may be easily carried at ones side as a load which does not interrupt normal motion associated with walking for example. The system is specific to
15 skis and not easily converted for use with other loads. In addition, the support is arranged and is of a nature not appropriate for heavy loads. While skis are too heavy to carry comfortably in ones for long periods, they are not too heavy when carried on a *single* shoulder.

Inventor Lehman presents a 'Traveler's Organizer Bag Luggage' as U.S. Patent
20 4,887,751. The bag includes a specialized strap system to aid in carrying the bag. The straps engage the body, one over the shoulder, another about the waist as shown in Fig 7. This configuration may be considered an alternative because the bag is more typically worn on the back as shown in the Figs 5 and 6. However when worn at the side, a case of considerable interest to the present discussion, the straps are arranged as mentioned. As
25 such, these straps tend to hold the bag up by transmitting weight of the bag to a single shoulder and further to hold the bag to the users side by transmitting a lateral force against bag motion away from the body to the waist strap. One can freely move ones body without fear of the bag falling away from the side.

A similar shoulder strap for a bag is taught as U.S. Patent 5,845,833 by Mr.
30 Murphy of California. It includes a special retractable strap within a primary strap which can be used to place support over a second shoulder when carrying a bag at one side. In

full consideration of the arrangement it is easy to understand that the secondary strap having two portions both lying on a user's back when worn as shown in Fig 2 tends to operate to hold the bag to the user rather than support weight of the bag. There will be little or no downward force on the strap and no downward force (weight) transmitted to the shoulder. The strap is primarily useful for causing the bag to be held close to the user's side and perhaps from banging on the hip.

Golf bags are very good examples of the type of bag which is difficult to carry for its weight and bulk. Accordingly, an expert in the field of support systems for bags would be quick to point out that golf bags are sometimes found with dual strap systems. In example, Inventors Reimers et al, teach of a specialized two strap system for distributing the heavy load of golf equipment to both of two shoulders of a wearer of the system. The straps are independently adjustable in length and further independently fastened to the golf bag at four common 'D' ring type fasteners.

In a very similar invention, Theodore-James Izzo teaches a bag carried at a user's back, the arrangement employing two straps to distribute the load where both straps are led over the shoulders and then under each arm to connect independently to the bag at two locations far from the other. This natural arrangement is necessary to allow one to provide good separation of the straps allowing a back carrying position.

Shoemaker teaches an interesting shoulder holster of two major components in U.S. patent 4,903,874. It has two shoulder straps which are at least partly interdependent.

Another golf bag taught by Izzo is illustrated in U.S. Patent 5,042,703. The design allows one to easily carry the bag on ones back and the two straps distribute the heavy weight of the bag evenly to two shoulders.

The disclosure of Han in recent U.S. Patent 5,988,475 includes a highly symmetric design and quick release mechanism to disengage the straps from terminal points at a special mount and flange member shown as '20' in the figures. The systems are particularly designed with a view to bags carried on the back and thus are not well suited when loads are to be carried at the side. The important difference arises because the human anatomy is symmetric from a position at the back but highly asymmetric from the side. Figure 3 indicates the strap system is clearly affixed to the bag via three points which tend to cause the back to properly lie on the wearers back.

Finally, Norris teaches in recent patent U.S. 5,669,170 a device for carrying elongated objects at one side. The system includes a plurality of straps, including particularly, a single shoulder strap and two torso straps as illustrated in Fig. 4. These straps promote torsional stability needed for long objects which tend to sway due to natural walking motions caused by the body.

As the list of systems and inventions presented above is quite numerous, an expert will fully appreciate that the field of the invention is well attended, each inventor addressing what is believed to be the most significant aspect of the problems foreseen, and thus it may be said that state of the art is considered 'crowded'. Of significant interest is the tendency for systems to promote stability of bags against motion induced by the wearer as one walks. This is why a great deal of torso straps are found. For systems having weight distribution as a priority, they use dual shoulder straps however those straps are arranged to be worn symmetrically over the shoulders while the load hangs to the rear.

While the systems and inventions of the art are designed to achieve particular goals and objectives, some of those being no less than remarkable, these inventions have limitations which prevent their use in new ways now possible. These inventions of the art are not used and cannot be used to realize the advantages and objectives of the present invention.

SUMMARY OF THE INVENTION

Comes now, Jeffrey Herold with inventions of ergonomically configured shoulder strap support systems. It is a primary function of these systems to provide improved support for loads to be carried at ones side. This is accomplished via a unique and special structural design created with great attention to aforementioned function. A dual shoulder strap configuration includes a first strap nearest the load and a second strap away from the load. Both straps are arranged to engage either of the two shoulders of a human user. In view of the anticipated load position relative to the shoulders, it is important to note the asymmetry associated with the system. The straps are designed in shape and form to cooperate with this asymmetry in a manner which makes wearing the support systems comfortable and thereby allowing one to increase the usefulness of

carrying devices. Further, the straps are formed in a manner which establishes a firm relationship between the two straps and they do not operate entirely independent of one another. In addition, these systems include strap length adjustment means which further tie the function of each strap to the other. Further, systems are comprised of strap ends
5 which facilitate the fastening of the systems to a plurality of types of loads including objects commonly known as bags, sacks, cases, et cetera.

Objectives of the Invention

It is a primary object of the invention to provide shoulder straps support systems.
10 It is an object of the invention to provide an improved ergonomically designed device to support heavy loads.

It is a further object to provide means to better distribute weight to one shoulders.

It is an object of the invention to provide dual shoulder strap arrangements for a bags carried at ones side.

15 A better understanding can be had with reference to detailed description of preferred embodiments and with reference to appended drawings. Embodiments presented are particular ways to realize the invention and are not inclusive of all ways possible. Therefore, there may exist embodiments that do not deviate from the spirit and scope of this disclosure as set forth by the claims, but do not appear here as specific
20 examples. It will be appreciated that a great plurality of alternative versions are possible.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims and
25 drawings where:

Figure 1 is a halftone image of a person wearing a device of these inventions;

Figure 2 is another halftone image of a different view of a device;

Figure 3 is a line drawing a device of the invention;

Figure 4 shows a device as it relates a load in the form of a bag;

30 Figure 5 illustrates the strap in use as it relates to a human user;

Figure 6 shows a similar use in a rear view; and finally

Figure 7 illustrates a special joint of the invention.

PREFERRED EMBODIMENTS OF THE INVENTION

5 In accordance with each of the preferred embodiments of the invention, there is provided ergonomically configured shoulder straps systems. It will be appreciated that each of the embodiments described may include apparatus and an apparatus of one preferred embodiment may be different than an apparatus of another embodiment.

A dual shoulder strap system of the invention includes two shoulder straps. A first of two shoulder straps is a 'proximal' strap characterized by its position with
10 regard to a load to be supported. A second of two shoulder straps is herein referred to as a 'distal' strap as characterized by its position with regard to a load to be supported. A proximal strap is shorter in length than a distal strap.

A device of the invention may be characterized via its profile. Apparatus of the inventions form a 'y' shape when viewed from a straight-on point of view. When
15 properly worn, the wearer's neck fits between the two upper portions of the shape, and the end of the lower portion is affixed to a load which rests at the wearer's side or hip. One will fully appreciate the limits of such two dimensional description and will consider the drawing figures in this specification for a more complete understanding.

Each of the two straps are preferably comprised of at least a pad portion and at
20 least one strip portion which connects a pad to other parts of the apparatus. The strips are preferably constructed in-part from rugged material such as nylon webbing. Portions of straps which are to engage the user's shoulders are formed of padded members. Thus reference to a 'dual strap' system is not meant to imply that a 'strap' is singular in the sense that is comprised of only one element. A 'strap' may be made of several or more
25 portions or elements.

To provide for a connection from a pad to a strip material, a sewn joint is preferred. It is recognized that a rivet or adhesive joint may also be used without loss of function desirable in objectives of the invention. In some versions, a strip may be continuous through the pad whereby padding material is merely wrapped about the
30 surface of a strip. Other versions include the arrangement where two strips are sewn to either end of an elongated pad.

The padded member of the distal strap may take a simple rectangular shape (while laying flat on a table) while the padded member of the proximal strap is formed in a special arcuate shape (also while laying flat on a table). The shape of the pad is constructed as described in order to better cooperate with the human form. When under load, these dual strap systems tend to put pressure on each shoulder at different angles since the applied load is asymmetric with regard to the two straps; i.e. systems of the invention are designed for side loads whereby such asymmetry is inherent. Because the applied load as transmitted through the straps causes the pad portions to engage the user in an asymmetric manner, the shape of the pads is designed to better address this directional loading. As such, one pad is without a curved bias, and the other includes one.

Each strap is also comprised of two length adjustment buckles. Each strap operates differently than the other and arrangement of length adjustment buckles on the respective straps suggest this operational difference. Two buckles on the proximal strap provide for length adjustment only. While two buckles on the distal strap provide for length adjustments, they are additionally arranged to include support for a fastening means. Thus a length adjustment buckle may be formed in combination with a clip member, for example, to provide for quick release connections to loads which may be applied.

A proximal strap is affixed to a distal strap. Two ends of a proximal strap may be sewn to portions not at the ends of the distal strap, but rather in a position between the ends. Although this joint is preferably done via stitching, i.e. a sewn joint, it may easily be made via alternative affixing means such as adhesives, rivets, et cetera. In preferred versions of these inventions, a special sewn joint is provided for strength. In view of the unique arrangement of the distal strap and proximal strap, in particular the angle which is formed between them when properly arranged, the end of the proximal strap may be folded about the distal strap to increase the amount of surface area common to the two straps. This increased stitching area yields a preferred joint for heavily loaded systems.

The relationship between the two shoulder straps is unique. A cooperation exists whereby the straps may be adjusted independently and in addition they may be adjusted in a dependent fashion. This is achieved via careful placement and arrangement of

adjustment buckles, two each on each strap. Adjustments in length to the distal strap control the height at which the load sets at the user's side. When such adjustment is made, the transmission of the load into the two straps is slightly changed. Thus is generally necessary to adjust the length of the proximal strap independently. By
5 shortening the proximal strap slightly, one causes a greater load to be put on that strap and taken from the distal strap. In this way, a user can easily balance the load between the two straps while also being able to fully control the height at which the load rests. It is instructive to note that where one has a reason to favor either side (shoulder), for example due to a preexisting injury, it is easy to place a greater percentage of the load on
10 one side compared to the other. This functionality is attained via the clever arrangement of adjustment buckles, two each on both straps.

Since the distal strap ends are to be connected to the load directly, it is preferable that the strap be terminated in a length adjustment buckle having additional functionality characterized by a fastening clip. A buckle that receives standard size webbing in a
15 fashion whereby length adjustments are made may additionally be arranged with a clip mechanism. Although alternative fasteners are anticipated, a clip provides the ability for these apparatus to be quickly removed from and applied to various types of loads each having a cooperating mechanical element. In the case of simple travel luggage, a "D" type ring fastener is common.

20 Attractive indicia may be applied to the pads to further enhance the aesthetic appearance of devices of the invention. Embroidery stitching can be easily integrated with a pad cover material. Indicia applied to a curved pad cooperates with the particular structural arrangements to provide a graphical look that is appealing. The natural curve of the human shoulder suggests a shape for the strap pad and thus further for graphical
25 objects which may be applied thereto.

With reference to the drawing figures, one will appreciate a more complete understanding of the invention. Figure 1 shows a gentleman user of devices of the invention correctly placed about the torso and more particularly resting upon the shoulders. A heavy load at the user's 1 side is supported by the dual strap system. The
30 weight of the load is transferred evenly into the proximal strap 2 and to the distal strap 3 and further to the able user's shoulders which are capable of supporting heavy loads for

long periods of time. It will be noted that the entire weight of the load is presented to the user's shoulders via pad elements which tend to distribute the load over an appreciably large surface area.

For proper sizing adjustments, the buckle 4 shown in the figure may be adjusted to cause the proximal strap 2 to be lengthened or shortened independently of the distal strap 3. In addition, the overall vertical position of the load can be adjusted via the adjustment buckle 6. The entire apparatus is affixed to the bag by way of a clip element 7 which may be incorporated with the adjustment buckle as a single combination device.

For completeness, Figure 2 shows a rear view of the same user 21 wearing the same shoulder strap system 22. The regularly shaped pad 22 of the distal shoulder strap engages the user's shoulder at the neck on the side opposite of that which the load is worn. The arcuate pad element 23 of the proximal strap 25 similarly engages the shoulder at the neck but the same side upon which the weight is supported. An adjustment buckle 24 is used to adjust the pressure supported by the proximal strap. A similar adjustment buckle 26 is integrated with a clip 27 which may be affixed to a "D" ring type fastener on a load.

Figure 3 is a drawing necessary to fully appreciate aspects of certain versions of these inventions as it is a clear line drawing without distractions of a load or a user. One can appreciate the general nature of the device as represented in the cartoon style drawing presented for simplicity and clarity. A distal strap 31 is formed of a pad element 32 and webbing elements or strips 33. Webbing elements may be affixed to a pad element via reinforced sewn joints 34. Webbing ends cooperate with adjustment buckles 35 to provide a length adjustment arrangement. Adjustment buckles used on distal straps may be of the special type which combines adjustability and is further provided with clip elements 36 for quick fastening to loads which cooperate with such clips, for example "D" ring type fasteners or connectors. These are distinct from buckles (see element 39) used for adjustment only which are preferably used only on the proximal strap. Similarly, proximal strap 37 may have a pad 38 buckles 39 arranged as shown. The proximal strap webbing element ends may be affixed to the distal strap to form a version of a dual strap system of the invention.

Figure 4 is a more detailed drawing which shows a dual strap system 41 in connection with a load of the type known as a satchel 42 or bag. Clips 43 are affixed to special "D" ring type fasteners on the bag. Webbing length adjustment buckles 44 attach the webbing ends of the distal strap to the clips and simultaneously provide for sizing adjustments. Proximal strap length adjustment buckles 45 provide for length adjustment only and do not include clip elements. Finally, pads 46 are provided as shown in cooperation with webbing strips of which either strap is comprised.

A more complete drawing to fully illustrate the relationship of the dual strap system with respect to a user and in particular a user's form is included as Figure 5. A gentleman user 51, wears a dual strap system of these inventions over his shoulders. A rectangular pad 52 engages his left shoulder as shown while an arcuate pad 53 engages the right shoulder as shown. In preferred versions, pad portions of straps are affixed to webbing portions via sewn joints 54. Proximal strap length adjustment buckle 55 which lies on at user's front side is used to change the length of the proximal strap in a fashion which causes weight to be distributed between the two straps evenly. This adjustment is an important aspect of preferred versions because it allows load distribution to adjusted properly. Without an adjustable length, the proximal strap would not be properly weighted for all users whose body shapes vary from one to another. One end of the proximal strap is affixed to the distal strap at joint 56 at the front side of the apparatus. A similar joint not shown drawing Figure 5 lies at the rear whereby the second end of the proximal strap is connected to the distal strap in a like fashion. Distal strap length adjustment buckle 57 allows the height of the load to be set. Distal strap adjustment buckle is terminated in a quick release clip 58 for attaching the dual strap system to a load. A careful observer will note that it is best to set the bag height, i.e. distal strap length, before the weight distribution, i.e. proximal strap length. This is due to the fact that shortening adjustments of the distal strap may cause slight angular changes which tend to cause an increase of the load being transferred to the proximal strap.

To perfect the story, a rear view of the apparatus and user is provided as drawing Figure 6. The back of the gentlemen user 61 is show with his left shoulder 62 engaged by a distal strap 63 and a right shoulder 64 engaged by a proximal strap 65 at the proximal strap pad portion 66. The pad portion of the distal strap is shown as 67. These

two straps are affixed together at a special sewn joint 68. The end of the proximal strap is folded over a mid portion of the distal strap to effect a large surface area 69 joint. Details of this joint are more fully describe herefollowing and in drawing Figure 7.

A special joint may be formed for added strength. In view of the way which two strips of webbing come together and form a cross over, a special sewn joint is formed to improve the overall strength of apparatus employing such joint. With reference to drawing Figures 7A, 7B, and 7C, one will fully understand the joint. Figure 7A shows a first strip of nylon webbing 71 which crosses under a second strip 72 at a reference angle of approximately 60 degrees. At the identical angle between the strips, the second strip is folded over 73 and partly back upon itself as illustrated in Figure 7B. The first strip is then moved in a direction 74 into the fold of the second strip. Stitching may then be effected over the entire area 75 common to both strips thus greatly increasing the holding power of the joint. In this way, forces within either strip are efficiently transferred to the other.

One will now fully appreciate how a dual strap load supporting apparatus is configured. Although the present invention has been described in considerable detail with clear and concise language and with reference to certain preferred versions thereof including the best mode anticipated by the inventor, other versions are possible. Therefore, the spirit and scope of the invention should not be limited by the description of the preferred versions contained therein, but rather by the claims appended hereto